

# International Liquidity, Financial Constraints and Private Investment in an Emerging Market Economy

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**Abstract**: This article examines whether or not the recent surge in the availability of international liquidity helps Turkey revive private investment expenditure. Unlike previous studies, this paper indicates that an increased availability of financial resources after 2002 played a detrimental role in the recent recovery of private investment in Turkey.

## I. Introduction

Recent studies in the theory of investment at the micro and macro levels have persistently postulated that private investment expenditure is very often constrained by the availability of financial resources in developed as well as in developing market economies (Tybout, 1983; Whited, 1992; Jaramillo *et al.*, 1993; Harris *et al.*, 1994). These constraints have also been considered as being one of the reasons behind the poor investment performance of many developing countries in the 1980s and 1990s (Serven and Solimano, 1992). Due to the presence of repression in their financial markets, many developing countries would encounter difficulties in raising sufficient financial resources from their domestic financial markets to finance their investment expenditure (MacKinnon, 1973 and Shaw, 1974 and Fry, 1988). Accordingly the removals of all exogenously imposed restrictions and interventions which have accounted for this repression have been viewed as the pre-condition for reviving investment expenditure and therefore stimulating economic growth. This also constitutes the theoretical back up for many countries that have pursued a policy effort of liberalising their financial markets. Turkey has been one of them, and began to gradually liberalise its financial market in 1982 (Aşıkoğlu and Ersel, 1993; Atiyas and Ersel, 1995)[1].

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[1] Beginning with 1982, Turkey first liberalised its domestic capital market by freeing interest rates and then introducing new financial institutions such as the Capital Market Board and the Istanbul Stock Exchange in 1986. Another drastic move in these reform efforts took place in the period of 1989-1990 with the announcement of the convertibility of the Turkish Lira (TL) and the liberalisation of the capital

Among others, the significance of financial constraints and the effect of their removal on private investment expenditure have been examined previously by Günçavdı *et al.* (1998) and Günçavdı and MacKay (2003). It has been found on the basis of the statistical significance of the financial variables that the availability of finance was crucial in explaining private investment expenditure, and that the financial liberalisation accordingly appears to have had a little impact on easing the stringency of these constraints on investment expenditure. According to these studies, private investment in Turkey is also prone to be positively related to the accelerator variable which captures the effects of domestic demand conditions in the economy.

Private investment expenditure in Turkey has recently been revived together with economic growth and constitutes an increasing share in total domestic absorption. This remarkable economic performance in recent years is particularly important because the Turkish economy accomplished economic growth just after the worst economic crises of its economic history. Various factors could be considered as to be the reason behind this success.[2] Among others, the high availability of international liquidity should be seen as particularly meaningful mainly because this high liquidity, together with appropriate macroeconomic conditions, enabled Turkey to have easy access to international financial resources which are vitally important for investment expenditure under liquidity constraints. In this regards, Figure 1 provides clear evidence for a substantial increase in capital inflows to the Turkish private sector. Despite its cyclical behaviour in the past, changes in the liability of the private sector, as a proxy for capital inflows, demonstrates an increasing trend after 2002.

In addition to this liquidity boom in the early 2000s, we also witnessed a drastic change in the structure of the domestic expenditure of Turkey after the economic crises in 2001. As shown in Table 1, the share of domestic investment expenditure gained importance, and its share in total expenditure gradually increased from 19% in 2001, to 38.2% in 2007. This increased share of investment can be considered as an investment boom, and it can be seen to be rather unusual, especially when we compare it with its previous levels before 2002, and this requires further

account, which removes all restrictions against the movement of capital in- and out-flows between Turkey and the world capital market.

[2] According to international observers, one of the factors is the presence of a single-party government after sucsesive coallition governments. Thie new political condition after the crises plays as the factor reducing political instability, which would reassure international investors about the sustainability of macroeconomic polcies. In this regard the sustainabile macroeconomic policies, guided by IMF, are considered as the second important factor. Finally the beginning of accession talks with the EU could be considered as the third factor. All these three factors seem to have helped the Turkish economy to facilitate easy access to internation capital.

explanation regarding the role of relaxing liquidity constraints in this recovery of investment.[3]

(*Figure 1 and Table 1 about here*)

The aim of this short paper is to examine the impacts of recent capital inflows to the Turkish private sector and to see whether or not these capital inflows reduced the stringency of liquidity constrains that have historically had an effect on private investment expenditure in Turkey.

## II. The Model and Empirical Analysis

The model is a hybrid model with compromising two distinctive constraints which have appeared to be significant in previous studies. These constraints are namely demand and financial constraints. Additionally, the model includes the cost of capital as the price variable. The derivation of the model in detail can be found in Günçavdı *et al.* (1998) and Günçavdi and McKay (2003), which yields the following unrestricted error-correction (UECM) model:

$$\Delta I_t = \phi_0 + \phi_1(L)\Delta y_t + \phi_2(L)\Delta c_t + \phi_3(L)\Delta crp_t + \phi_4(L)\Delta I_{t-1} + \xi\left(I^*_{t-1} - I_{t-1}\right) \qquad (1)$$

$$\sum\phi_1(L) > 0\,,\ \ \sum\phi_2(L) < 0\,,\ \ \sum\phi_3(L) > 0\,,\ \ \xi > 0\,.$$

where the presence of $y_t$ (and $\Delta y_t$ in the short run) and $crp_t$ (and $\Delta crp_t$ in the short run) enable us to capture the impacts of demand and financial constraints respectively.

Equation (1) is estimated over the sample period 1987:1-2007:4 using quarterly data.[4] All variables, except the implicit cost variable (which is already in proportional form), are expressed in logarithms, and are seasonally unadjusted. The credit-to-the-private-sector variable was employed as a proxy to capture the effects of financial liquidity constrains, and is theoretically expected to have a positive influence on investment expenditure. Together with this variable, we also introduce an additional variable (*cif*) which assumingly captures the effect of liquidity constraints. This variable is net changes in the dollar liabilities of the private sector, and is derived form the capital accounts of the balance of payment data. As in Figure

[3] The composition of investment expenditure is rather more informative, and reveals that the recent investment boom in Turkey largely took place as replacement investment. This conclusion can be drawn from the relatively high share of machinery investment, which seems to have increased more than building investment. Building invesment together with mechinery investment would imply a net expansion in the existing capital stock. However any disproportional increase in mechinary investment against building investment could be considered as a substitution in the existing capital stock with the new ones without significantly expending the level of existing capital stock in the economy.

[4] The data is also available on the website of the Central Bank of Turkey (www.tcmb.gov.tr).

1, an easy change in access to international liquidity for the private sector is expected to relax financial constraints, and then enables them to increase investment expenditure significantly. In our empirical estimations we examine whether the high liquidity period after 2002 influenced the responsiveness of the Turkish private investment expenditure to liquidity constraints and the cost of capital variable.[5] To estimate the impact of accessibility of high liquidity in the international market, a dummy variable is introduced in the UECM which takes the value 1 in 2002 and subsequently, and zero before 2002. With the inclusion of multiplicative dummy variables which are generated by multiplying the dummy variable with both liquidity and the cost-of -capital variables, we are empirically able to examine whether or not this period after 2002 possesses a statistically distinctive impact on the Turkish private investment behaviour.

The statistical properties of the variables in question in this study were tested using the Augmented-Dickey-Fuller unit root test, ensuring that they all possess unit root, and we conclude that they must be differenced once before using them particularly in the estimation of the short run model in (1).

(*Table 2 about here*)

The results of the estimation of equation (1) are reported in Table 2. The UECM appears to fit the Turkish data well with an adjusted $R^2$ value varying between 0.60 and 0.80. The estimated models are well specified according to well-known diagnostic tests. Regression (1) of Table 2 shows the basic UECM assuming no changes in the stringency of liquidity constraints, and implies that Turkish private investment is co-integrated with the real aggregate demand and the cost of capital variables. The liquidity constraint, which is included in the UECM with the lag value of credit-to-the-private sector variable in column (1), is influential in the short run together with the cost of capital variable.

Regression (2) shows the estimation result with the multiplicative dummy variables with the liquidity and the cost of capital variables. The effects of these variables in the short and long run are separately examined. In each estimation result, there are four multiplicative variables, and there statistically significance is jointly tested. The results are presented at the bottom of column (2) and (3). According to the test results, the zero restriction on all multiplicative dummy variables is rejected. Despite the statistically significance of the liquidity constraint

[5] One of the components of the cost of capital variable is interest rate. In the periof after 2002 the Turkish government showed very strong commitment to a disinflation policy, which allows for a substaintial amount of reduction in interest rates. Together with high liquidity and easy accesibility of financial resources from international market the interest rates that the investor were exposed to in the international market were relatively low.

variable *Δcrp*, its multiplicative term seems to be insignificant, suggesting that there have been no statistically changes in the responsiveness of the private investment expenditure to changes in liquidity constraint in the short run. However, although the same variable appears to be insignificant in the long run, co-integration relationship, its multiplicative terms (*DUM*crp(-1))* appears to be highly significant implying that the easy accessibility of liquidity after 2002 reduced the stringency of financial constraints only in the long run. The cost-of-capital variable is, on the other hand, significant in the short and long term, and the responsiveness of Turkish private investment expenditure appears to have declined in regardto this variable after 2002.

A similar estimation is repeated in the column of (3) with the only difference being the presence of the capital-inflows variable (*Δcif* and *cfi*) in the estimation instead of the credit-to-the-private sector variable. The results that are derived from (2) do not drastically change after this substitution. The joint test for the zero restriction test also confirms that the availability of high liquidity after 2002 reduced the stringency of financial constraints and the impacts of cost-of-capital variable.

## III. Conclusion

The role of financial constraints in the demand for capital investment has extensively been examined in the literature, and accordingly the availability of financial liquidity has been considered to be an important detrimental factor for investment expenditure. This is also true for Turkey. Previous studies showed that although Turkey liberalized its financial market and gradually removed all restrictions on financial markets, financial liberalisation appeared to help very little in the recovery of private investment expenditure in Turkey. However Turkish private investment expenditure has recently shown a very high performance in an international environment where international liquidity has surged significantly due to the weak US dollar. Unlike previous studies on Turkey, we show in this paper that the availability of high international liquidity helped to reduce the stringency of financial constraints and increased investment expenditure in Turkey. It has also shown that the cost of capital also significantly decreased in the period of high liquidity. Regarding the findings of previous studies, our result here also implies that not only the availability of domestic liquidity stimulated by liberalisating domestic financial markets, but also the international liquidity stance in the world markets are crucial for the revival of domestic aggregate expenditure.

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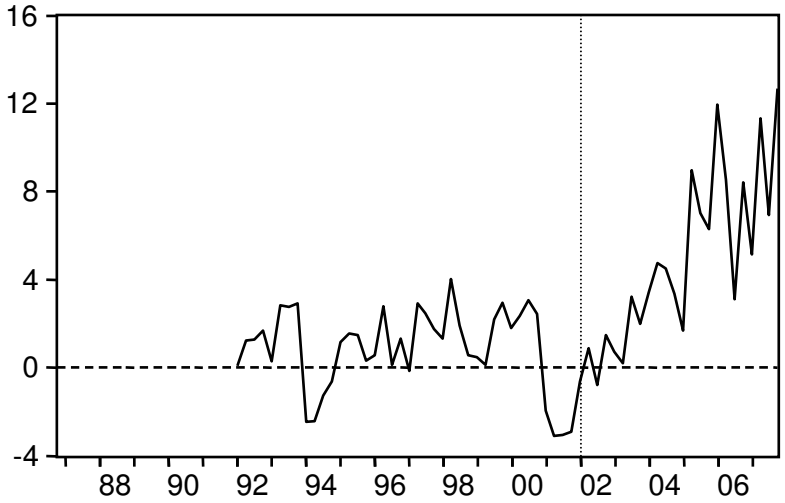


**Figure 1 – Capital inflows to the Turkish private sector**
(The figures in the graph are increases in private sector liabilities in the balance of payment tables of Turkey)

**Table 1 - Macroeconomic Expenditure Components of the Turkish Economy**

| | | | Components of Investment | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Year** | **C** | **G** | **Machinery** | **Building** | **Stock** | **Total** | **X** | **M** | **NX** |
| 1987 | 68,6 | 7,9 | 9,1 | 15,8 | 0,9 | 25,8 | 15,6 | 17,8 | -2,2 |
| 1988 | 67,8 | 7,6 | 8,7 | 15,3 | -0,9 | 23,1 | 18,1 | 16,6 | 1,5 |
| 1989 | 66,9 | 7,6 | 8,3 | 16,1 | 0,7 | 25,2 | 18,0 | 17,7 | 0,3 |
| 1990 | 69,3 | 7,5 | 10,9 | 15,0 | 1,8 | 27,8 | 17,0 | 21,6 | -4,6 |
| 1991 | 70,1 | 7,8 | 11,5 | 14,6 | -1,1 | 25,0 | 17,4 | 20,3 | -2,9 |
| 1992 | 68,9 | 7,7 | 11,4 | 14,5 | 0,5 | 26,4 | 18,4 | 21,5 | -3,1 |
| 1993 | 69,5 | 7,6 | 15,3 | 14,8 | 1,6 | 31,6 | 18,4 | 27,1 | -8,7 |
| 1994 | 69,0 | 7,7 | 11,1 | 15,4 | -3,2 | 23,3 | 22,2 | 22,2 | 0,1 |
| 1995 | 67,5 | 7,6 | 13,1 | 14,4 | 1,8 | 29,3 | 22,3 | 26,6 | -4,4 |
| 1996 | 68,2 | 7,7 | 15,1 | 14,1 | -0,4 | 28,7 | 25,3 | 29,9 | -4,6 |
| 1997 | 68,8 | 7,4 | 17,2 | 13,9 | -1,3 | 29,9 | 28,0 | 34,0 | -6,0 |
| 1998 | 67,0 | 7,8 | 15,1 | 13,8 | -0,4 | 28,6 | 30,4 | 33,7 | -3,4 |
| 1999 | 68,5 | 8,7 | 12,5 | 13,2 | 1,7 | 27,3 | 29,6 | 34,1 | -4,5 |
| 2000 | 67,8 | 8,7 | 15,6 | 12,3 | 2,6 | 30,5 | 32,9 | 39,9 | -7,0 |
| 2001 | 66,5 | 8,6 | 8,8 | 11,9 | -1,5 | 19,1 | 38,2 | 32,4 | 5,8 |
| 2002 | 63,0 | 8,4 | 8,6 | 10,3 | 5,1 | 24,1 | 39,3 | 34,8 | 4,6 |
| 2003 | 63,5 | 7,7 | **10,9** | **8,8** | **7,7** | **27,4** | 43,1 | 41,8 | **1,4** |
| 2004 | 64,1 | 7,1 | **15,6** | **8,3** | **8,1** | **32,1** | 44,5 | 47,8 | **-3,3** |
| 2005 | 64,9 | 6,8 | **18,0** | **9,7** | **5,3** | **32,9** | 45,0 | 49,6 | **-4,6** |
| 2006 | 64,4 | 7,0 | **18,8** | **10,9** | **3,0** | **32,7** | 46,0 | 50,1 | **-4,1** |
| 2007 | 63,6 | 6,6 | **21,0** | **10,6** | **6,6** | **38,2** | 48,9 | 57,3 | **-8,4** |

Sources: Central Bank of Turkey, www.tcmb.gov.tr

## Table 2 - Estimation results†

| | *Dependent variable: Δip* | | |
|---|---|---|---|
| *Independent variables* | (1) | (2) | (3) |
| constant | -7,687<br>(-6,112)* | -8,954<br>(-6,619)* | -7,815<br>(-4,240)* |
| *Δy* | 1,988<br>(5,473)* | 1,19<br>(4,055)* | 1,492<br>(3,207)* |
| *Δcrp(-1)* | 0,651<br>(2,074)** | --- | --- |
| *Δcrp* | --- | 0,764<br>(2,805)* | --- |
| ***DUM*Δcrp*** | --- | **-0,182<br>(-0,376)** | --- |
| *Δcif* | --- | --- | 0,021<br>(0,835) |
| ***DUM*Δcif*** | --- | --- | **-0,030<br>(-0,813)** |
| *Δcost* | -0,0001<br>(-3,308)* | -0,0002<br>(-3,401)* | -0,0002<br>(-2,411)** |
| ***DUM*Δcost*** | --- | **0,0002<br>(3,151)*** | **0,0001<br>(1,428)** |
| *ip(-1)* | -0,752<br>(-6,715)* | -0,735<br>(-7,954)* | -0,646<br>(-5,312)* |
| *y(-1)* | 2,370<br>(6,402)* | 2,614<br>(7,052)* | 2,301<br>(4,578)* |
| *crp(-1)* | --- | 0,0189<br>(0,7492) | --- |
| ***DUM *crp(-1)*** | --- | **-0,032<br>(-3,585)*** | --- |
| *cif(-1)* | --- | --- | 0,048<br>(2,082)** |
| ***DUM *cif(-1)*** | --- | --- | **-0,091<br>(-4,098)*** |
| *cost(-1)* | -0,0002<br>(-4,063)* | -0,0005<br>(-4,374)* | -0,0004<br>(-4,438)* |
| ***DUM *cost(-1)*** | --- | **0,0002<br>(2,578)**** | **0,0004<br>(4,237)*** |
| *Adj-R²* | 0,610 | 0,798 | 0,729 |
| *Normality - χ²(2)* | 1,922 | 1,158 | 3,997 |
| *Autocorrelation- χ²(4)* | 0,275 | 0,041 | 0,856 |
| *Functional form- χ²(1)* | 2,716 | 0,159 | 0,007 |
| *Heteroscedasticity- χ²(1)* | 1,581 | 1,409 | 0,414 |
| *ARCH- χ²(4)* | 0,575 | 1,920 | 1,132 |
| *Joint test for the reduction in the stringency of financial constraints after 2002* | | F(4, 66)=7,975<br>[3,65]‡ | F(4,47)=5,225<br>[3,83]‡ |

† The seasonal dummies are included in all estimations, but they are not reported in the table.

‡ The critical values for the *F* test at the 1% significance level.

Notes: "*", "**" and "***" indicate significant coefficients at 1 %, 5% and 10% confidence intervals respectively. All lower case variables are in logarithms and notation is as follows: [ip]= private investment; [*y*]=gross domestic product; [*cost*]= cost of capital; [*crp*]= credit to the private sector; [*cif*]= capital inflows; [*DUM*]= 1 for t≥2002, or 0 otherwise. Figures in parentheses are t-statistics. "Normality" is the Jarge-Bera test for normality of the residuals and is distributed as chi-square with two degrees of freedom. "Heteroscedasticity" is a test of correlation of squared residuals with the fitted values, and is distributed as chi-square with one degree of freedom. "Autocorrelation" is the Lagrange multiplier test of residual for serial correlation with the four degrees of freedom. "Functional form" is Ramsey's RESET test with the square of fitted values.